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ABSTRACT

A survey of former students of the Wisconsin Vocational, Technical, and Adult Education (VTAE) wood technics programs and employers in woodworking industries was conducted during spring of 1985. General objectives were to determine job classifications, types of businesses, and relative importance of tasks or duties in various woodworking-related occupations, and to seek information on future trends and suggestions for improving training in the program. A total of 77 questionnaires from former students and 57 from employers were processed for this study. Some of the findings were as follows: (1) former students were employed in a broad array of 14 occupations, with a noticeable decrease in unemployment and an increase in self-employment; (2) nearly half of the former students were employed in residential construction and/or contracting, while a fifth of the employers were in this type of business; (3) all woodworking occupational categories listed in the questionnaire were represented in the ranking of the 29 tasks rated most important by former students and employers; (4) training subjects receiving the highest ratings by both former students and employers included safety, blueprint reading, use and care of tools and machines, problem solving, wood and lumber materials, and communications; (5) respondents indicated that VTAE schools could help them by offering update seminars or courses on new materials and applications and new technology; and (6) the majority of former students rated the wood technics program as very good or excellent. Recommendations for course modifications and updatings were to be made from the results of the study. (KC)

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EVALUATION STUDY
OF
VTAE WOOD TECHNICS PROGRAMS

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1985

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CE 042 516

Wisconsin Board of Vocational, Technical and Adult Education
Madison, Wisconsin

FOREWORD

Vocational education is based upon the continuous assessment of the social, economic, and occupational needs of the individual and society. It is most effective when the theories, concepts, and processes to be learned are taught in a context of their current and emerging applications and occupational requirements.

New developments in science and technology are transforming the nature of the workplace and creating corollary demands for new skills and knowledges needed by the labor force. These phenomena necessitate relevant responsive changes and improvements in the occupational education and training programs. If vocational education programs are to be closely related to the occupations of people, then they must be sensitive to the changes taking place in the world of work. Follow-up of former students, surveys of employers, and research are needed to maintain standards of curriculum, quality of staff, and relevance of instruction.

This document can be used by curriculum developers, instructors, advisory committees and administrators to assist in the decision-making relevant to the improvement of Wood Technics Programs in the Wisconsin VTAE system.

ACKNOWLEDGEMENTS

This study could not have been completed without the assistance and cooperation of many people.

Thanks and appreciation are extended to the local Wood Technics instructors, T & I coordinators, R and P administrators, and UW-Stout staff for their assistance and expertise in the design and conduct of this study; to the graduates, employees, and employers who took valuable time to respond to the questionnaires; to UW-Stout for processing the returns; and, finally, to Theresa Post for typing this report.

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I
INTRODUCTION

Background: The Wisconsin Vocational, Technical and Adult Education (VTAE) system offers over 300 different full-time programs leading to an associate degree, one- and two-year and short-term vocational diploma programs with a total of over 1,100 individual programs offered throughout the state.

Wood Technics is a one-year vocational diploma program offered in seven of the sixteen VTAE districts, and a two-year diploma program offered in one of the districts. It includes instruction in basic concepts, fundamentals, equipment, materials and processes relating to woodworking industries. The programs are designed to prepare students for entry-level skills and knowledge in the trades of carpentry, cabinetmaking, furniture making, millwork, finishing and other related woodworking occupations.

Problem/Need: There are changes taking place in the woodworking industries and there is a need for investigating certain aspects of the VTAE Wood Technics courses and programs. Although the follow-up study of 1982-83 graduates indicates respectable job placement, there has been a recent trend of declining enrollments in the Wood Technics programs.

Purpose/Objectives: The overall purpose of this study was to find out why enrollments in Wood Technics programs are declining.

Specific objectives were:

1. Determine the types of job titles/classifications obtained by former VTAE students.

2. Determine the types of businesses/firms in which former students obtained employment.

3. Determine the extent to which employers use alternative sources of supply of woodworking-related employees.

4. Determine the relative importance of duties and tasks performed on the job as perceived by former students and employers.

5. Determine the relative importance of various courses, subjects and units of curriculum/instruction as perceived by former students and employers.

6. Determine emerging technologies, equipment, materials and processes in woodworking fields as perceived by employees and employers.

7. Determine ways in which VTAE schools and employers can improve collaboration to better meet the needs for education and training.

Methodology/Procedures: The WBVTAE Bureau of Program Development and Operations, the Bureau of Planning and Management Information, the UW-Stout Center for VTAE, and selected VTAE districts cooperated in the design, conduct and processing of this study.

WBVTAE state staff drafted questionnaires which were sent to the UW-Stout Center for VTAE, and to local VTAE districts for suggestions to improve validity, accuracy, consistency, and overall design. Packets of the final Graduate/Employee Questionnaires and Employer Questionnaires were mailed during April to each VTAE District Research and Planning Administrator with a cover letter asking them to coordinate the survey in their respective districts.

The survey involved a representative 35 percent sample of former students who graduated during each of the past three years from the Wood Technics program in the seven VTAE districts offering the program. In addition, these districts were to survey at least ten representative employers. Districts with no Wood Technics graduates were asked to survey three employers only.

Completed questionnaires were returned to the WBVTAE for editing and preliminary tabulations. They were then sent to the UW-Stout CVTAE for computer processing. The printouts were used as a basis for the compilation of the Findings/Results Sections of this report.

II
FINDINGS/RESULTS - GRADUATE/EMPLOYEE SURVEY

Of the approximately 150 Graduate/Employee questionnaires mailed, 79 (52.7%) were returned. This section includes highlights of Statewide and VTAE district findings from the 77 usable returns. Two questionnaires were received too late for tabulation.

Table 1 indicates that WWTI of LaCrosse had 27.3% of the returns while BTI and FVTI with fewer graduates and/or shorter duration of programs each had 2.6% of the returns.

Table 1
RESPONDENTS BY VTAE DISTRICT (Q 1-2)

VTAE District	N	%
One, Eau Claire	10	13.0
WWTI, LaCrosse	21	27.3
MATC, Madison	9	11.7
BTI, Janesville	2	2.6
FVTI, Appleton	2	2.6
NWTI, Green Bay	8	10.4
MSTI, Wisconsin Rapids	10	13.0
WITI, Shell Lake	15	19.5
State Total	77	100.1 (rounded)

Table 2 indicates that 17% of the former students were self-employed upon termination of their VTAE training while only one former student was a machine maintenance worker. Twelve percent were not employed in the wood technics area.

Table 2
INITIAL EMPLOYMENT (Q 3-4)

Area	VTAE District								Total	
	One	WWTI	Mad.	BTI	FVTI	NWTI	MSTI	WITI	Ch	%
Self-employed			5		1		1	6	13	17
Trainee	1							1	2	3
Carpenter's Apprentice	2	4						1	7	9
Carpenter's Helper	3	5	1					1	10	13
Cabinetmaker's Apprentice										
Cabinetmaker's Helper		1	1			3	1	1	7	9
Furniture Maker Apprentice										
Furniture Maker Helper			1					1	2	3
Rough Carpenter	1	2				1	3	2	9	12
Machine Maintenance Worker							1		1	1
Office Worker	2								2	3
Draftsperson	1	1							2	3
Salesperson		1				1			2	3
Estimator	1	1							2	3
Other (Specify)		5	2	2				1	10	13
Not employed in Wood Technics area		1				1	5	1	9	12

Ch = Number of checks (some checked more than one); % = percent (rounded) based on N of 77 not on total checks.

Write-in initial employment, with VTAE districts in parentheses were: carpenter (WWTI-2); cabinetmaker, remodeling, pre-hung wood and steel doors, lead man wood shop, cabinetmaker (WWTI); machine set up/operator in furniture factory (MATC-Madison); and commercial carpenter (WITI).

Table 3 indicates that 28% of the respondents were currently self-employed, while only one was employed as an office worker. Only 7% were not employed in a wood technics area. There is a noticeable shift to self-employment and "other areas" from initial to current employment.

Table 3
CURRENT EMPLOYMENT (Q 5-6)

	VTAE District								Total	
Area	One	WWTI	Mad.	BTI	FVTI	NWTI	MSTI	WITI	Ch	%
Self-employed	3	5	4			2	2	5	21	27
Trainee	1	1							2	3
Carpenter's Apprentice	1	1					1	2	5	6
Carpenter's Helper	1	1				3			5	6
Cabinetmaker's Apprentice			1				1	1	3	4
Cabinetmaker's Helper		1	3	1		1			6	8
Furniture Maker Apprentice						1		1	2	3
Furniture Maker Helper										
Rough Carpenter	1	2				1	2	3	9	12
Machine Maintenance Worker										
Office Worker	1								1	1
Draftsperson	1	1						2	4	5
Salesperson		3					1	1	5	6
Estimator	1	1						1	3	4
Other (Specify)	3	3	1	1		1	4	5	18	23
Other (Specify)		2					1	2	5	6
Not employed in Wood Technics area	2	2				1			5	6

Write-ins for current employment were: carpenter (One, WWTI-2, MSTI); project manager, journeyman carpenter, carpenter foreman (One); patternmaker (furniture), roofer and assistant engineer (WWTI); cabinetmaker (WWTI, NWTI, MSTI); logging and truckdriver for millwork company (MSTI); superintendent, self-employed sheetrocking/plastering, cabinet setter-mobilehomes, mason worker, computer layout, engineer, driver for lumber yard, and field engineer (WITI).

Table 4 indicates that nearly half (47%) of the former students were initially employed in residential construction, while 1% were initially employed by firms in the manufacture of millwork products, restoration of furniture and truss builder.

Table 4
TYPE OF BUSINESS EMPLOYED IN FOR FIRST JOB (Q 7-8)

Type of Business/Firm	VTAE District One	WWTI	Mad.	BTI	FVTI	NWTI	MSTI	WITI	Total Ch	Total %
Residential Construction and/or Contractor	6	10	4			2	5	9	36	47
Commercial or Industrial Construction	3	3						2	8	10
Cabinetmaking Shop		1	2	1		3	1	2	10	13
Furniture Making Shop		1	2			1			4	5
Retail/Wholesale Lumberyard/Dealer Building Supply House Hardware Store Warehousing Only	1	5				1			7	9
Manufacture of Millwork Products		1							1	1
Farm Building Construction (other than houses)		2						1	3	4
Restoration of Buildings	1	2	1				1	1	6	8
Restoration of Furniture		1							1	1
Truss Builder		1							1	1
Other (Specify)	1	1	1	1	2		2	4	12	16

Write-ins for the type of business for first job were: self-employed architect in spare time (One); occupational woodshop rehab center, and Peace Corps (WWTI); furniture factory (MATC-Madison); thermoforming industry (BTI); pre-fabrication and office furniture (FVTI); Wisconsin Conservation Corps (MSTI); self-employed sheetrocking/plastering, mobile home factory, decorating products retailer, and logger (WITI).

Table 5 indicates that 64 (83%) of the former students performed at least some carpentry duties with 100% of the former students from District One, FVTI and WITI performing some carpentry tasks or duties.

Table 5
PERFORMANCE OF CARPENTRY DUTIES (Q 9-10)

	Total		VTAE District One		WWTI		Mad.		BTI		FVTI		NWTI		MSTI		WITI	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
"Yes" to Q 9	64	83	10	100	17	81	6	67	1	50	2	100	6	75	7	70	15	100
"No" to Q 10	13	17	-	-	4	19	3	33	1	50	-	-	2	25	3	30	-	-

Write-in carpentry tasks/duties with the VTAE district in parentheses were: metal stud construction, hang a blank door (One); most modern methods of construction, pleasing the customer, aluminum siding, soffit and facia, blow-in insulation, design roof and floor systems, engineer trusses, (WWTI); lay formica (MATC-Madison); mill wood to specs, mix and poor epoxys (BTI); trusses (NWTI); install ceiling/roof trusses, install pre-built kitchen cabinets, cover windows with aluminum trim (MSTI); bid jobs, collection of pay (WITI).

Table 6 indicates the rank of top thirteen carpentry tasks/duties based on the mean (average) of the response to each carpentry item as they appear in Appendix D.

All mean figures in this report are computed on the basis of responses to each item on a Likert-Type scale of 1 to 5 where 1 = "Not Important" and 5 = "Critically Important." The "omits" are not included in the denominator of the calculation.

Table 6
RANK OF TOP THIRTEEN CARPENTRY TASKS/DUTIES (Q 11-47)

Identify building materials
Use and maintain power tools
Use and maintain hand tools
Frame and align interior walls
Frame and align exterior walls
Install interior trim
Read architectural/construction blueprints
Install joists/subfloors
Install wood siding
Install interior door
Install windows
Install exterior door
Frame/install rafters

Table 7 indicates that about half (49%) of the former students performed some masonry/concrete tasks/duties.

Table 7
PERFORMANCE OF MASONRY/CONCRETE DUTIES (Q 48-49)

	Total		VTAE District													
			One		WWTI		Mad.		BTI		FVTI		NWTI		MSTI		WITI	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
"Yes" to Q 48	38	49	9	90	9	43	2	22					2	25	6	60	10	67
"No" to Q 49	39	51	1	10	12	57	7	78	2	100	2	100	6	75	4	40	5	33

Write-in masonry/concrete tasks/duties with VTAE district in parentheses were: trowel cement (One); finish concrete (One, WWTI); set wire mesh, use wheelbarrow (MSTI); flat pours (MSTI, WITI); pour and screed concrete (WITI-2); treat concrete for salt, lay brick (WITI).

Table 8 indicates the top three masonry tasks based on mean scores of those responding to the item as they appear in Appendix D.

Table 8
RANK OF TOP THREE MASONRY/CONCRETE TASKS/DUTIES (Q 50-55)

Calculate concrete needed for job
Install concrete forms
Calculate concrete blocks needed

Table 9 indicates that 49 (64%) of the 77 former VTAE students performed cabinetmaking tasks/duties, while 10 (48%) of the 21 former students from WWTI performed them.

Table 9
PERFORMANCE OF CABINETMAKING DUTIES (Q 58-59)

	Total		VTAE District													
			One		WWTI		Mad.		BTI		FVTI		NWTI		MSTI		WITI	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
"Yes" to Q 58	49	64	9	90	10	48	9	100	1	50	2	100	7	88	3	30	8	53
"No" to Q 59	28	36	1	10	11	52			1	50			1	12	7	70	7	47

Write-in cabinetmaking tasks/duties with VTAE district in parentheses were: many others (WWTI); pricing products (Madison); please your customer, tile on counter tops, maintain tools and machines (WITI).

Top ranking cabinetmaking tasks based on average of responses by those responding to the item appear in Table 10 as taken from Appendix E.

Table 10
RANK OF TOP SEVEN CABINETMAKING TASKS/DUTIES (Q 60-72)

Read cabinet drawings/blueprints
Interpret cabinetry specifications
Assemble cabinet
Apply finishing materials
Layout and cut cabinet components
Make and install drawers
Install cabinet

Table 11 indicates that 24 (32%) of the 77 former students were performing furniture making tasks/duties.

Table 11
PERFORMANCE OF FURNITURE MAKING DUTIES (Q 74-75)

	Total		VTAE District													
			One		WWTI		Mad.		BTI		FVTI		NWTI		MSTI		WITI	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
"Yes" to Q 74	24	32	2	20	8	38	5	56	0	0	1	50	2	25	3	30	3	20
"No" to Q 75	52	68	8	80	13	62	4	44	2	100	1	50	6	75	7	70	11	73

Write-in furniture making duties were: many others (WWTI); and pricing (MATC-Madison).

Table 12 rankings are compiled from data in Appendix E.

Table 12
RANK OF TOP FIVE FURNITURE MAKING DUTIES (Q 76-85)

Finish furniture
Read furniture drawings (blueprints)
Cut furniture components
Assemble furniture
Interpret furniture specifications

Table 13 indicates that only 14 (18%) of the 77 former students were performing patternmaking tasks/duties. A few interpreted the term broadly to include patterns for rafters, furniture parts, etc.

Table 13
PERFORMANCE OF PATTERNMAKING DUTIES (Q 87-88)

	Total		VTAE District													
			One		WWTI		Mad.		BTI		FVTI		NWTI		MSTI		WITI	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
"Yes" to Q 87	14	18	1	10	5	24	1	11	1	50	1	50	1	13	2	20	2	13
"No" to Q 88	63	82	9	90	16	76	8	89	1	50	1	50	7	87	8	80	13	87

Write-in suggestion for patternmaking was: many others (WWTI).

Table 14 rankings are compiled from data appearing in Appendix E.

Table 14
RANK OF TOP TWO PATTERNMAKING TASKS/DUTIES (Q 89-91)

Construct Patterns
Design Patterns

Table 15 indicates that 30 (39%) of the former students performed administrative tasks/duties.

Table 15
PERFORMANCE OF ADMINISTRATIVE TASKS/DUTIES (Q 93-94)

	Total		VTAE District													
			One		WWTI		Mad.		BTI		FVTI		NWTI		MSTI		WITI	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
"Yes" to Q 93	30	39	5	50	10	48	4	44	0	0	1	50	1	13	3	30	6	40
"No" to Q 94	46	60	5	50	11	52	5	56	2	100	1	50	7	88	7	70	8	53

Write-in administrative tasks/duties were: many others (WWTI); be flexible, respect employees, respect customers (WITI).

Table 16 rankings are compiled from data which appear in Appendix E.

Table 16
RANK OF TOP FIVE ADMINISTRATIVE TASKS/DUTIES (Q 95-105)

Order materials
Wait on/serve customers
Schedule work assignments
Charge sales to customers' accounts
Take inventory

Write-in suggestion for courses/subjects: "It depends on what the individual is looking for." (FVTI)

Table 17 rankings are compiled from data appearing in Appendix F.

Table 17
RANK OF TOP SIXTEEN COURSES/SUBJECTS/UNITS OF INSTRUCTION (Q 108-142)

Safety
Blueprint Reading
Fundamentals of building construction
Use and care of portable power tools
Estimating/Bills of materials
Problem solving
Use and care of machines
Use and care of hand tools
Applied arithmetic
Wood and lumber materials
Architectural drawing
Fundamentals of cabinetmaking
Building codes
Insulation materials/installation
Oral communications
Written communications

Table 18 indicates that all areas of the woodworking occupations are represented in the top 25 tasks or duties, and approach "Critically Important." Data are taken from Appendixes D and E.

Table 18
OVERALL RELATIVE IMPORTANCE OF TOP TWENTY-FIVE TASKS/DUTIES[a]

Task/Duty (Area)[b]	Mean
Construct patterns (PM)	4.69
Finish furniture (FM)	4.61
Order materials (ADM)	4.57
Read cabinet drawings/blueprints (CM)	4.56
Design patterns (PM)	4.54
Read furniture drawings (blueprints) (FM)	4.52
Cut furniture components (FM)	4.52
Assemble furniture (FM)	4.50
Read pattern/casting blueprints (PM)	4.46

Table 18 (Continued)

Task/Duty (Area)	Mean
Interpret furniture specifications (FM)	4.43
Interpret cabinetry specifications (FM)	4.41
Assemble cabinet (CM)	4.32
Layout furniture components (FM)	4.29
Apply finishing materials (CM)	4.28
Layout and cut cabinet components (CM)	4.27
Make and install drawers (CM)	4.23
Design furniture (FM)	4.19
Identify building materials (Carp)	4.18
Wait on/serve customers (Adm)	4.15
Schedule work assignments (Adm)	4.15
Draw detailed furniture plans (FM)	4.14
Install cabinet (CM)	4.13
Calculate concrete needed for a job (Con)	4.13
Use and maintain power tools (Carp)	4.05
Use and maintain hand tools (Carp)	4.00

(a) Ranking based on Mean figures computed from a Likert-Type scale 1-5 where 1 = "Not Important," 5 = "Critically Important"

(b) Note: Carp = Carpentry duties (N=64); Con = Masonry/concrete duties (N=38); CM = Cabinetmaking duties (N=49); FM = Furniture making duties (N=24); PM = Patternmaking duties (N=14); ADM = Administrative duties (N=30).

Responses to Q 145-148

VTAE districts and frequency of responses are indicated in parentheses.
Q 145: What new technologies, etc., are emerging which should be studied?

- Don't know (One-2) (Madison) (MSTI-2)
- Wood floor trusses, insulations and vapor barriers (One) (WITI)
- Updated materials in building field, new lumber sizes, new siding (One)
- Computers used for estimating (One)
- Making raised panel doors for cabinets (One)
- Solar homes, energy (One, WWTI-4) (WITI)
- Pre-fab housing (quality) (WWTI)
- Air nailers, air tools (WWTI) (WITI)
- Computerized machines (WWTI) (FVTI) (NWTI)
- Computer programming (WWTI)
- Wood foundations (WWTI)
- More on remodeling (WWTI) (MSTI)
- Lasers (WWTI)
- Power screeds (WWTI)
- Use of computers (WWTI) (Madison) (WITI-2)
- Better accuracy studies on trusses (WWTI)
- Use of laminates (WWTI) (NWTI)
- European design (WWTI) (MSTI)
- Commercial building (Madison)

- Precision millwork (BTI)
- Types of insulation (NWTI) (MSTI)
- Customer relations (NWTI)
- Construction with component systems (NWTI)
- Robotics, laser, CAM systems (MSTI)
- Automation (MSTI)
- Super insulation (MSTI) (WITI)
- Energy related items (MSTI)
- Newer power tools (MSTI)
- Remodeling (sky lights, paneling, decorating, lighting) (MSTI)
- Pre-built homes (modular and custom built) (MSTI)
- Concrete work (MSTI)
- Laser beams in use of installing ceilings, metal studs, pipe, etc., tilt wall construction (WITI)
- Use of plastics and laminates (WITI)
- Earth sheltered housing (WITI)
- The importance of production (WITI)
- Use of wood veneers, veneer fiber core (WITI)
- Computer drafting, engineering and layout (WITI)
- TV pull-out with swivel-hardware (WITI)

Q 146: How can VTAE schools better meet your needs?

- Computer courses in evening (CAD/CAM) (One)
- Don't know (One)
- Courses to update knowledge of current materials and applications (One) (WITI)
- Evening classes on tool sharpening (One)
- The one-year course should be two years (One)
- Part-time courses to update (One) (WWTI-3) (Madison)
- Longer more intensive courses (WWTI)
- Teach for being a contractor and not so much a worker (WWTI)
- Send booklets about new techniques and materials to grads (WWTI)
- Mail announcements of courses to graduates (WWTI)
- Seminars on new construction techniques in building business (Madison) (MSTI) (WITI)
- They meet my needs fine (Madison)
- Seminars on business operations (Madison) (WITI)
- Tax and legal information (Madison)
- A think tank type meeting where you can talk with people about sales, marketing and accounting problems (Madison)
- Night courses which teach proper use of machines and safety (FVTI)
- Part-time courses at night during winter months (NWTI)
- More job-related examples into the classroom (MSTI)
- I am on the road a lot (MSTI)
- Publishing a list of software (MSTI)
- Have one-semester courses and covering basic procedures on the job (MSTI)
- Seminars on do-it-yourself - covering various topics (MSTI)
- Areas of taxes, real estate purchases, financial matters (WITI)
- Start woodworking in the high schools involving voc-tech training (WITI)
- Night time drafting courses (WITI)
- More wood shops with closer supervision (WITI)

- Building code update (WITI)
- Do more with computers (WITI-2)
- Better awareness of setting up a tax plan for self-employed carpenter to avoid large end of year payment (WITI)

Q 147: How would you rate the overall training received? Following are tabulations by VTAE district:

District One = 6 Excellent, 4 Very Good
WWTI = 7 Excellent, 9 Very Good, 4 Good
MATC-Madison = 7 Very Good, 1 Good
BTI = 1 Excellent, 1 Very Good
FVTI = 1 Excellent, 1 Very Good
NWTI = 2 Excellent, 6 Very Good
MSTI = 7 Very Good, 2 Good, 1 Fair
WITI = 6 Excellent, 7 Very Good, 1 Good

Q 148: Additional suggestions for VTAE schools to improve Wood Technics program:

- Have program at Eau Claire 2 years to go from start to finish of a building (One-2)
- Try to get more projects similar to Oak Wood Hills, more complicated houses for a realtor, etc., off campus (One)
- The supervisors should relate more toward the students, one-to-one basis (One)
- More help in finding a job (One)
- Gear more subjects towards commercial construction (One)
- Bookkeeping for contractors (One)
- Concentration on the business end (WWTI)
- Include welding (WWTI)
- Keep up the studies (WWTI)
- Need first aid (WWTI)
- A project like "Weather Haven" available for every class (WWTI)
- More hands-on experience (WWTI-2) (MSTI)
- Improve architectural instruction (WWTI)
- Run the course for 2 years (fall and spring quarters) (WWTI)
- Make it a two-year course - first year studying, second year on-site (MSTI-2)
- House for NSP was good experience (WWTI)
- The program prepared me very well for various jobs, excellent instructors (WWTI)
- Should have been more time on framing, trim, hanging solid core door, installing cabinets (WWTI)
- The different trades should be separated if possible so each course could get more detailed (WWTI)
- Information on running your own business (Madison)
- Much more training on residential and commercial building (Madison)
- School has equipment you don't find in most cabinet shops (Madison)
- A system of providing graduates with market trends and changes, enabling us to provide the services desired by the Wisconsin community (Madison)
- I think it would be a good idea to teach one year of cabinetmaking and one year of just construction techniques and fundamentals. There is too much to learn in both fields in one semester (Madison)

- Schools should stick with more common woodworking machinery which a smaller shop would have (Madison)
- I really enjoyed my year at MATC (Madison)
- Teach millwork in the shop (BTI)
- Stricter rule on attendance, drugs, grading process (FVTI)
- Work more with veneering technics (FVTI)
- More detailed or extra courses in estimating (NWTI)
- More detailed or extra courses in construction management (NWTI)
- My training at NWTI was second to none, taught me much (NWTI-2)
- More time in the shop (NWTI)
- The use of different building tasks (NWTI)
- Update technical areas of the Wood Technics field, provide information for energy efficient counterparts in home design industry (MSTI)
- Less time on human relations (MSTI)
- More up-to-date books (MSTI)
- More practical experience on the job, students build full-size home (MSTI)
- On-the-job training before school is out (MSTI-2)
- Update equipment to a modern facility (MSTI)
- Offer optional 1 year or 2 year programs (MSTI)
- WITI did a nice job in presenting the "real world" (WITI)
- A few more field trips to construction sites to talk with contractors (WITI)
- Teachers were very helpful (WITI-2)
- More on human relations, why people get angry, more about yourself, why you act the way you do (WITI)
- There should be updates with all of the cabinetmaking courses (WITI)
- Spend more time in directly related courses, such as shop (rough and cabinet), drafting and estimating (WITI)
- Get some computer course in the program (WITI)

III
FINDINGS/RESULTS - EMPLOYER SURVEY

This section includes statewide and district findings from the completed Employer Questionnaires. Balance of state includes VTAE districts which do not offer a Wood Technics program. Of the estimated 160 Employer questionnaires mailed, 60 (37.5%) were returned and 57 (35.6%) are used in this report.

Table 19 indicates the number of employers responding varied from two in VTAE District One to twelve in BTI.

Table 19
RESPONDENTS BY VTAE DISTRICT

VTAE District	N	%
One, Eau Claire	2	3.5
WWTI, LaCrosse	7	12.3
MATC, Madison	7	12.3
BTI, Janesville	12	21.1
FVTI, Appleton	3	5.3
NWTI, Green Bay	5	8.8
MSTI, Wisconsin Rapids	6	10.5
WITI, Shell Lake	11	19.3
Balance of State	4	7.0
Total	57	100.1 (Rounded)

Table 20 indicates only one employer as a building supply house while there were 12 in residential construction. Twenty-one were in "other" types of business.

Table 20
RESPONDENTS BY TYPE OF BUSINESS (Q1, Q2)

Type of Business/Firm	VTAE District One	WWTI	Mad.	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total Ch	Total %
Residential Construction and/or Contractor		3		2		2		5		12	21
Commercial or Industrial Construct. &/or Contractor		1		1	1			2	1	6	11
Cabinetmaking Shop			3	3	3				1	10	18
Furniture Making Shop			1		2		1		2	6	11
Retail/Wholesale Lumberyard/Dealer		2	1	2				1		6	11
Building Supply House							1			1	2
Hardware Store										0	0
Warehousing Only										0	0
Manufacture of Millwork Products	1	2	2	2		1		1	1	10	18

Table 20 (Continued)

Type of Business/Firm	One	WWTI	Mad.	VTAE District BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total Ch	Total %
Farm Building Construction (other than houses)				2						2	4
Restoration of Buildings		1								1	2
Restoration of Furniture										0	0
Truss Builder		1	2	1			1			5	9
Other (Specify)	1	1	2	6	1	2	3	4	1	21	37
Total	2	11	11	19	7	5	6	13	6	80	144

Ch = checks, some respondents checked more than one type of business
% = Percent of N. N = 57

Write-in "other" types of businesses (Q 2-5) with VTAE districts in parentheses were as follows:

Cement fabricator (One); furniture manufacturer (WWTI); manufacturer of wood building components (Madison); foundry pattern repair, manufacture of handcrafted exotic wood gift boxes, manufacture horse stalls, panelized homes, operable walls and accordion doors, industrial woodworking, wood products (BTI); institutional furniture manufacturer, designer and manufacturer of fast food interiors (FVTI); wholesale distribution only (2), manufacturer of aluminum and steel fabrication, partical board and doors manufacturer (MSTI); retail/wholesale decorating products, steel casting foundry pattern shop, retail furniture, manufacturer of mobile homes (WITI); manufacturer of hollow core and solid core doors (NA).

Table 21 indicates that six firms employed 51-100 people, while 12 employed 101 or more.

Table 21
SIZE OF FIRMS BASED ON TOTAL EMPLOYEES WORKING LOCALLY FULL TIME (Q 3)

Size of Firm	One	WWTI	Mad	VTAE District BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
Five or Less		2		3		1		4		10	18
6-10		2	1	2		2		3		10	18
11-25			2	4		1	2			9	16
26-50		1	2	1	1			1	3	9	16
51-100			1				3	2		6	11
101 or Over	2	2	1	2	2		1	1	1	12	21
										56	100

Table 22 indicates that about half the respondents employed five or less woodworking-related workers on a full-time or year round basis.

Table 22
EMPLOYMENT OF WOODWORKING RELATED WORKERS YEAR ROUND (Q 4)

Categories of # of Employees	VTAE District One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
None	1			2			3	1	1	8	14
1-2	1	1		2		1		1		6	11
3-5		3	2	2		2	1	4		14	25
6-10		1	1	5		1		2		10	18
11-25		1	3	1					2	7	12
26 or More		1	1		3	1	2	2	1	11	19
Total	2	7	7	12	3	5	6	10	4	56	99

Table 23 indicates that about one-fourth of the full-time woodworking-related employees came from VTAE schools. Many did not respond to this item.

Table 23
NUMBER OF FULL-TIME WOODWORKING RELATED EMPLOYEES FROM VARIOUS SOURCES
(Q 4-7, 8, 9)

Sources	VTAE District One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
VTAE		22	20	4	4	28	11	14	3	106	24
H.S.		4	16	9	10	2	4	30	3	78	18
Off the Street w/OJT	2	25	62	19	15	13	60	32	27	255	58
Total	2	51	98	32	29	43	75	76	33	439	100

Table 24 indicates that over half (53%) of the employers did not hire part time additional or seasonal woodworking-related workers, while one (2%) hired 11-25 part timers.

Table 24
EMPLOYMENT OF ADDITIONAL SEASONAL/PART TIME
WOODWORKING RELATED EMPLOYEES (Q 5)

Categories of # of Employees	VTAE District One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
None	2	2	3	9	2	1	4	5	2	30	53
1-2		1	2	1		3		1		8	14
3-5		1		1	1			3	1	7	12
6-10		1	1	1					1	4	7
11-25							1			1	2
26 or More		1					1			2	4

Table 25 indicates that a majority (83%) of the part-time additional woodworking-related employees were hired "off the street" and given on-the-job training.

Table 25
NUMBER OF ADDITIONAL WOODWORKING-RELATED EMPLOYEES FROM VARIOUS SOURCES
(Q 5-7, 8, 9)

Categories of Sources	VTAE District One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
VTAE		12	1			1	50	1		65	8
H.S.		4	2		2	2	55	5	4	74	9
Off Street/OJT		24	7	10	3	2	615	3	2	666	83
Total		40	10	10	5	5	720	9	6	805	100

Table 26 indicates a relative even spread of employees in the various occupations listed with the exception that nearly half (46%) were special machine operators of various kinds.

Table 26
WOODWORKING EMPLOYEES BY JOB CLASSIFICATIONS (Q 6)

Job Title/ Classification	VTAE District One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
Cabinetmaker		9	40	13	21			1	22	106	7
Cabinetmaker - Apprentice/Helper		1	16	2	15			7	7	48	3
Cabinetmaker - Supervisor			8	2	3			1	6	20	1
Cabinet/Furniture Finisher			5		31				5	41	3
Carpenter (all around)		14	14	9	3	2	3	54		99	6
Carpenter (rough)		13	3	15	15	2		18	10	76	5
Carpentry (finish work only)		7	2	5	15	1		4	4	38	2
Carpenter - Apprentice/Helper		5	15	1	5	53	1	15	2	97	6
Carpenter Supervisor		1	1	2	4			6	4	18	1
Painter (houses, buildings)								1		1	
Estimator, Pricing, Specifications		4	7	9	4		1	5	6	36	2
Architectural Draftsperson		6	4	6	5		2	2	7	32	2
Woodworking Tool/Machine		2	10		41	5		20		78	5
Salesperson		50	6	3	3	1	2	12	42	119	8

Table 26 (Continued)

Job Title/ Classification	VTAE District One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
Special Machine Operator (specify)	27	6	1	1			640	25	1	701	46
Other (specify)			3	14				7		24	2
Total	27	118	135	82	165	64	649	178	116	1,534	99

Write-in types of machine operators (Q 7-6) were as follows: moulders (Milw. also), double ends, rip saw, band saw, finger jointers, edge gluers (One); NCR, R-9 router (WWTI); sanders, routers, drills, moulder (BTI); door manufacture equipment operators (MSTI); truss manufacture (MSTI); saws, nailers, (WITI).

Write-in job classifications (Q 7-7) were: truss manufacturer, pattern repairman (BTI); pattern repair-rigging-making, general labor (WITI). Table 27 indicates that employees performed carpentry duties in 44 (77%) of the firms responding.

Table 27
PERFORMANCE OF CARPENTRY TASKS/DUTIES (Q 8-9)

	VTAE District One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI	Bal. of State	Total N	Total %
"Yes" to Q 8		7	5	10	2	5	2	10	3	44	77
"No" to Q 9	2		2	2	1		4		1	13	23

Write-in carpentry tasks/duties (Q 45-46) were as follows: build simple tables for production use (BTI); knowledge of all the above (Madison); make moulding, make frames (WITI).

Table 28 indicates the rank of the top six carpentry tasks/duties based on the mean (average) of the responses to each item on the Likert-type scale. Rankings are compiled from data appearing in Appendix D.

Table 28
RANKING OF TOP SIX CARPENTRY TASKS/DUTIES (Q 10-46)

Use and maintain power tools
Use and maintain hand tools
Interpret construction specifications
Read architectural/construction blueprints
Identify building materials
Install interior trim

Table 29 indicates that less than a fourth (23%) of the employers said their employees performed masonry/concrete tasks/duties. Remove forms was the top ranking task as indicated in Table 30.

Table 29
PERFORMANCE OF MASONRY/CONCRETE DUTIES (Q 47-48)

	VTAE District								Bal. of State	Total	
	One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI		N	%
"Yes" to Q 47	1	2		2	1	1	1	4	1	13	23
"No" to Q 48		5	7	10	2	4	5	7	3	43	75

Write-in masonry/concrete tasks/duties (Q 55-56) were: all types of cement fabrication (One); and finish concrete (WITI).

Rankings in Table 30 are compiled from data in Appendix D.

Table 30
RANKING OF TOP THREE MASONRY/CONCRETE TASKS/DUTIES (Q 49-54)

Remove forms
Install concrete forms
Calculate concrete needed for a job

Table 31 indicates that over half (54%) of the employers said their employees performed cabinetmaking tasks/duties. Read cabinet drawings/blueprints was the top ranking task as indicated in Table 32.

Table 31
PERFORMANCE OF CABINETMAKING TASKS/DUTIES (Q 57-58)

	VTAE District								Bal. of State	Total	
	One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI		N	%
"Yes" to Q 57		5	6	7	3	1	1	5	3	31	54
"No" to Q 58	1	2	1	5		4	5	6	1	25	44

Write-in cabinetmaking tasks/duties (Q 72) were as follows: finish carpentry as it relates to installation of cabinets (Madison); set up and maintain machinery and tooling (FVTI).

Rankings in Table 32 are compiled from data which appear in Appendix E.

Table 32
RANK OF TOP SEVEN CABINETMAKING TASKS/DUTIES (Q 59-71)

Read cabinet drawings/blueprints
Interpret cabinetry specifications
Apply plastic laminates
Assemble cabinet
Make and install drawers
Layout and cut cabinet components
Install cabinet

Table 33 indicates that about a fourth (26%) of the employers said their employees performed furniture making tasks/duties. Assemble furniture ranked highest as indicated in Table 34.

Table 33
PERFORMANCE OF FURNITURE MAKING TASKS/DUTIES (Q 73-74)

	VTAE District								Bal. of State	Total	
	One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI		N	%
"Yes" to Q 73		2	3	3	3		1	1	2	15	26
"No" to Q 74	1	5	4	9		5	4	10	2	40	70

Write-in furniture making duties (Q 84) were: maintain tools, jigs and fixtures (FVTI); and upholster (MSTI).

Rankings in Table 34 are compiled from data which appear in Appendix E.

Table 34
RANK OF TOP FIVE FURNITURE MAKING TASKS/DUTIES (Q 75-83)

Assemble furniture
Cut furniture components
Interpret furniture specifications
Layout furniture components
Read furniture drawings (blueprints)

Table 35 indicates that only 19 percent of the employers indicated their workers performed patternmaking tasks/duties. There was some indication of misunderstanding of this term to also include patterns for furniture making, etc. Construct patterns ranked highest as indicated in Table 36.

Table 35
PERFORMANCE OF PATTERNMAKING TASKS/DUTIES (Q 86-87)

	VTAE District								Bal. of State	Total	
	One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI		N	%
"Yes" to Q 86		2		3	2		1	2	1	11	19
"No" to Q 87	1	5	7	9	1	5	4	9	3	44	77

A write-in patternmaking duty (Q 91) was: jig construction (WITI).

Rankings in Table 36 are compiled from data which appear in Appendix E.

Table 36
RANK OF TOP TWO PATTERNMAKING TASKS/DUTIES (Q 88-90)

Construct patterns
Design patterns

Table 37 indicates that workers in 40 percent of the firms performed administrative tasks/duties. Take inventory and order materials were two of the most important tasks as indicated in Table 38.

Table 37
PERFORMANCE OF ADMINISTRATIVE TASKS/DUTIES (Q 92-93)

	VTAE District								Bal. of State	Total	
	One	WWTI	Mad	BTI	FVTI	NWTI	MSTI	WITI		N	%
"Yes" to Q 92		2	6	5	1		1	6	2	23	40
"No" to Q 93	1	5	1	7	2	5	4	5	2	32	56

Write-in administrative duties (Q 105-106) were: establish and maintain files, maintain records (WITI).

Rankings in Table 38 are compiled from data which appear in Appendix E.

Table 38
RANK OF TOP FIVE ADMINISTRATIVE TASKS/DUTIES (Q 94-104)

Take inventory
Order materials
Assemble data for bookkeeping services
Schedule work assignments
Wait on/serve customers

Table 39 indicates the employers rated safety as the most important course or subject to be included in the wood technics program. Rankings are compiled from data which appear in Appendix F.

Table 39
RANK OF TOP SIXTEEN COURSES/SUBJECTS/UNITS OF INSTRUCTION (Q 107-141)

Safety
Use and care of portable power tools
Blueprint reading
Use and care of hand tools
Wood and lumber materials
Use and care of machines
Oral communications
Problem-solving
Applied arithmetic
Written communications
Applied human relations
Fundamentals of building construction
Fundamentals of millwork
Hardware, fasteners, glass
Plastics, laminates, adhesives, etc.
Applied algebra, geometry

Write-in courses, subjects or units of instruction (Q 142-143) were: use of dial calipers and micrometers (One); operation of automatic equipment (WWTI); sharpening of chisels, scrapers, etc. (Madison); working to tight tolerances, working from casting blueprints (WITI).

Table 40 indicates that all areas of the woodworking occupations are represented in the top 25 tasks or duties. Although the means rank above "important," the employer ratings are consistently lower than the VTAE graduates averages. Rankings are compiled from data which appear in Appendix E.

Table 40
OVERALL RELATIVE IMPORTANCE OF TOP TWENTY-FIVE TASKS/DUTIES (a)

Task/Duty (Area)	Mean
Read cabinet drawings/blueprints (CM)	4.35
Interpret cabinetry specifications (CM)	4.10
Take inventory (ADM)	3.95
Apply plastic laminates (CM)	3.90
Order materials (ADM)	3.85
Construct patterns (PM)	3.82
Assemble cabinet (CM)	3.80
Make and install drawers (CM)	3.77
Assemble data for bookkeeping services (ADM)	3.75
Use and maintain power tools (Carp)	3.70
Assemble furniture (FM)	3.67
Use and maintain hand tools (Carp)	3.65
Layout and cut cabinet components (CM)	3.63
Cut furniture components (FM)	3.60
Interpret furniture specifications (FM)	3.57
Interpret construction specifications (Carp)	3.56
Design patterns (PM)	3.55

Table 40 (Continued)

Task/Duty (Area)	Mean
Read architectural/construction blueprints (Carp)	3.55
Remove forms (Con)	3.50
Install cabinet (CM)	3.48
Layout furniture components (FM)	3.47
Finish furniture (FM)	3.47
Read furniture drawings (FM)	3.46
Identify building materials (Carp)	3.45
Schedule work assignments (ADM)	3.40

Responses to Q 144-147

VTAE districts and frequency of responses are indicated in parentheses.

Q 144: What new technologies, etc., are emerging which should be studied?

- The use of lasers and computer operated equipment (One)
- Energy conservation (WWTI-2) (WITI)
- Adhesives (WWTI)
- Time saving techniques (WWTI)
- CNC operated equipment (WWTI) (Madison) (FVTI)
- Microprocessor operated robotics (WWTI) (FVTI)
- The studies of W. Edwards Deming and Phillip Crosby (WWTI)
- Commercial cabinetry (Madison)
- Use of composition materials with joinery of (Madison)
- European style cabinets (Madison)
- Computer program design (Madison) (FVTI)
- More plastic laminate cabinet work (Madison)
- Cost saving through effective use of materials and labor (Madison)
- Fiber core with wood and plastic veneer coverings (Madison)
- New manufacturing systems and design of furniture (Madison)
- CAD/CAM (BTI) (FVTI-2)
- Ways of using up scrap to save energy (BTI)
- Applying catalyzed finishes (BTI)
- 32 MM cabinet system (BTI) (Milw.)
- Roof/floor truss design and analysis (BTI)
- Computers (BTI) (FVTI) (NWTI)
- Advanced machinery (BTI)
- More conservation, solar energy (NWTI) (WITI)
- Learn to listen (NWTI)
- Pressure sensitive sanding (MSTI)
- Process controlled and computer controlled equipment (MSTI)
- Ceramic tile materials and application (WITI)
- Use of epoxy, polyester, castables, urethanes (WITI)
- Superinsulation (WITI)
- Wood foundations (WITI)
- First line supervision (WITI)
- Human relations (WITI)
- Wood veneers (LTI)
- Automatic equipment (LTI)

Q 145: How can VTAE better meet your individual or business needs?

- Seminars or part-time courses dealing with the millwork industry (One)
- More mass production courses (WWTI)
- Jigs and fixtures (WWTI)
- Seminars on estimating (WWTI)
- Seminars on new materials, etc. (WWTI) (Madison) (MSTI) (LTI) (WITI)
- Training of present employees for flexibility and advancement (Madison)
- Additional refresher courses
- Make present courses more demanding (BTI)
- Teach to be on time and dependability (BTI)
- Part time work at a business (FVTI)
- Continuing education (night) courses for carpenters and cabinetmakers (FVTI)
- Present summary of business operations (MSTI)
- Use of hand tools (WITI)
- Layout procedures as lifted from Eng. designers (WITI)
- Basic courses on the use of hand and power tools (WITI)
- Seminars on building codes and energy (WITI)
- Seminar on supervision (NA)
- Part time course on wood identification (NA)
- Update on computers and automated equipment (Milw.)

Q 146: How can business improve training of students?

- Plant tours (One) (WWTI) (Madison) (BTI-3) (FVTI) (WITI)
- Guest speakers (One)
- Publications (One)
- On-the-job training in the field (Madison) (NWTI) (WITI) (LTI)
- Wood technics advisory committee (Madison)
- More integration with related business (Madison)
- People from industry teach in classes (Madison)
- All of the above (on questionnaire) (FVTI-2)
- One week of work in a business as part of class curriculum (FVTI)
- Student work with one contractor on the job one day per week (NWTI)
- Get evaluation from graduates (WITI)
- Co-op program (Milw.)

Q 147: Additional comments:

- Instill importance of good positive attitude (WWTI)
- More time spent with buildings, structures, components, and not so much on furniture and other small projects (WWTI)
- Study Japanese management concepts (WWTI)
- Quality assurance, in search of excellence (WWTI)
- Encourage artistic attitude (Madison)
- Stress importance of business aspects and what it takes to stay afloat (Madison)
- Encourage practical experience and on-the-job training (Madison)
- Teach employer expectations, being on time, job attitude, quality and quantity of work (Madison)
- Safety (Madison)

- Should be a two-year course
- Make students understand the competitiveness of today's job market and industry in general (BTI)
- Improve promotion of wood technics program at state level. Many woodworkers are not aware of the program (FVTI)
- Keep abreast of current trends, new technology (2)
- Students should be made aware of employment opportunities (NWTI)
- Course is not long enough (WITI)
- This questionnaire does not apply to a retail furniture store (WITI)
- Condensed courses should be available in evenings, probably 2-3 days per week for 1-3 month sessions (WITI)
- Stress more on hand tool use and techniques (Milw.)

IV
COMPARISON OF SELECTED RESULTS FROM FORMER STUDENTS AND EMPLOYERS

This section contains comparisons of selected results from former students and employers. It must be remembered that some of the employers did not employ former VTAE Wood Technics graduates.

Table 41 indicates that nearly half (47%) of the VTAE graduates were initially employed in residential construction work while a fifth (21%) of the employers were in this type of business. Almost another fifth (18%) of the employers were in the business of manufacturing millwork products.

Table 41
TYPE OF BUSINESS: GRADUATE INITIAL EMPLOYMENT AND EMPLOYERS

	Graduates (77)		Employers (57)	
	Ch	%	Ch	%
Residential construction and/or contractor	36	47	12	21
Commercial or industrial construction and/or contractor	8	10	6	11
Cabinetmaking shop	10	13	10	18
Furniture making shop	4	5	6	11
Retail/wholesale lumber yard/dealer	7	9	6	11
Building supply house			1	2
Hardware store				
Warehousing only				
Manufacture of millwork products	1	1	10	18
Farm building construction (other than houses)	3	4	2	4
Restoration of buildings	6	8	1	2
Restoration of furniture	1	1		
Truss builder	1	1	5	9
Other (specify)	12	16	21	37

Some respondents checked more than one.

Graduates were asked whether or not they performed tasks/duties in the various trades or occupational areas, and employers were asked whether or not their employees performed tasks/duties in the various trades or occupational areas.

Table 42 indicates a fairly close "agreement" between the graduates and employers as to the percentage of each group performaing tasks in the various areas, with one exception being in the masonry/concrete area. Graduates performed these tasks at a higher rate (49%) than employers indicated (23%).

Table 42
PERFORMANCE OF VARIOUS TASKS/DUTIES

Tasks/Duties	Graduates (77) Ch	Graduates (77) %	Employers (57) Ch	Employers (57) %
Carpentry	64	83	44	77
Masonry/concrete	38	49	13	23
Cabinetmaking	49	64	31	54
Furniture making	24	32	15	26
Patternmaking	14	18	11	19
Administrative	30	39	23	40

Table 43 indicates rankings of the top twenty-nine tasks/duties considered to be relatively important by both graduates and employers based on computation of mean scores from a Likert-type scale of 1 to 5. Note that for some unknown reason, with few exceptions, the employers mean scores are consistently lower than those for the graduates. However, all means are 3.14 or above which is "important" or above.

Table 43
TOP TWENTY-NINE TASKS/DUTIES RANKED BY GRADUATES AND EMPLOYERS

Task/Duty (Area)[b]	Means/Averages[a] Graduates	Means/Averages[a] Employers
Construct patterns (PM)	4.69	3.82
Finish furniture (FM)	4.61	3.47
Order materials (Adm)	4.57	3.85
Read cabinet drawings/blueprints (CM)	4.56	4.35
Design patterns (PM)	4.54	3.55
Read furniture drawings (blueprints) (FM)	4.52	3.46
Cut furniture components (FM)	4.52	3.60
Assemble furniture (FM)	4.50	3.67
Interpret furniture specifications (FM)	4.43	3.57
Interpret cabinetry specifications (FM)	4.41	4.10
Assemble cabinet (CM)	4.32	3.80
Layout furniture components (FM)	4.29	3.47
Apply finishing materials (CM)	4.28	3.14
Layout and cut cabinet components (CM)	4.27	3.63
Make and install drawers (CM)	4.23	3.77
Identify building materials (Carp)	4.18	3.45
Schedule work assignments (Adm)	4.15	3.40
Install cabinet (CM)	4.13	3.48
Calculate concrete needed for a job (Con)	4.13	3.23
Use and maintain power tools (Carp)	4.05	3.70
Use and maintain hand tools (Carp)	4.00	3.65
Install counter top (CM)	3.98	3.38
Make materials list (CM)	3.87	3.27
Apply plastic laminates (CM)	3.83	3.90
Install concrete forms (Con)	3.82	3.33

Table 43 (Continued)

Task/Duty (Area)[b]	Means/Averages[a] Graduates	Employers
Take inventory (Adm)	3.57	3.95
Interpret construction specifications (Carp)	3.49	3.56
Assemble data for bookkeeping services (Adm)	3.48	3.75
Remove forms (Con)	3.22	3.50

(a) Ranking based on Mean figures computed from a Likert-Type scale 1-5 where 1 = "Not Important" and 5 = "Critically Important."

(b) NOTE: Carp = Carpentry duties (64 grads, 44 emp.); Con = Concrete/masonry duties (38 grads, 13 emp.); CM = Cabinetmaking duties (49 grads, 31 emp.); FM = Furniture making duties (24 grads, 15 emp.); PM = Patternmaking duties (14 grads, 11 emp.); Adm = Administrative duties (30 grads, 23 emp.).

Table 44 indicates the top sixteen courses or subjects considered to be important by both graduates and employers with a mean of 3.11 or higher.

Table 44
TOP SIXTEEN COURSES/SUBJECTS/UNITS OF INSTRUCTION
RANKED BY GRADUATES & EMPLOYERS (Q 108-142) (Q 107-141)

	Means/Averages Graduates	Employers
Safety	4.55	4.38
Blueprint reading	4.37	3.94
Fundamentals of building construction	4.32	3.51
Use and care of portable power tools	4.27	4.00
Problem solving	4.19	3.71
Use and care of machines	4.15	3.79
Use and care of hand tools	4.11	3.88
Applied arithmetic	4.09	3.69
Wood and lumber materials	4.07	3.80
Fundamentals of cabinetmaking	3.92	3.11
Oral communications	3.71	3.73
Written communications	3.67	3.58
Fundamentals of millwork	3.58	3.33
Plastics, laminates, adhesives, etc.	3.48	3.29
Hardware, fasteners, glass	3.40	3.33
Applied human relations	3.49	3.52

Staff should review data in appendixes D, E and F for their respective VTAE districts and compare it to the data in Tables 43 and 44. It is conceivable that certain topics not appearing in Tables 43 and 44 may also be important for certain VTAE districts.

V
SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Summary

A survey of former students from the VTAE wood technics programs and employers in woodworking industries was conducted during the late spring of 1985. General objectives were to determine job classifications, types of businesses, relative importance of tasks or duties in various woodworking related occupations and to seek information on future trends and suggestions for improving training in the program. A total of 77 questionnaires from former students and 57 from employers were processed for this report.

Conclusions

1. Former students were employed in a broad array of 14 occupations initially and currently with a noticeable decrease in the unemployed and an increase in self-employment.

2. Nearly half of the former students were employed in residential construction and/or contracting, while a fifth of the employers were in this type of business.

3. About a fourth of the full-time woodworking related employees were reported as being employed from VTAE schools.

4. All woodworking occupational categories listed in the questionnaire were represented in the ranking of the top twenty-nine tasks/duties rated most important by the former students and by the employers.

5. There was general agreement between former students and employers as to the occupational areas of tasks/duties performed.

6. Most of the top twenty-nine tasks/duties rated most important by former students were also rated most important by employers.

7. Former students tended to rate most of the tasks/duties at a consistently higher rate than did employers.

8. The training subjects or courses receiving the highest ratings by both former students and employers included safety, blueprint reading, use and care of tools and machines, problem-solving, wood and lumber materials, and communications.

9. Energy conservation, solar energy, superinsulation, uses of lasers, computers, and microprocessor operated equipment were indicated among the emerging technologies.

10. Respondents indicated that the VTAE schools could help them by offering update seminars or courses on new materials and their applications, new processes, business, finance and office operations, computers, selected skills courses, and other areas.

11. There was some indication that the wood technics program should be lengthened.

12. There was some indication of the desire for more practical experience on the job as part of the curriculum.

13. Employers indicated several ways in which they could improve the training of students, such as through tours of plants, on-the-job training in the field, teaching at the school, and serving on advisory committees.

14. The majority of former students rated the overall training received as "very good" to "excellent."

Recommendations

Although some VTAE district response rates were small, all district staff and advisory committees having responsibilities for wood technics programs should analyze their respective district data and state data and make recommendations for modification, continuance or termination of the program in their respective VTAE district. They should also give serious consideration to developing and providing seminars and courses to meet specific evolving continuing education and training needs.

BJK:tjp
8/8/85

APPENDIX A

Requests

Request: 85-68

Due: May 25, 1985

Date: April 12, 1985

Subject: Study of Wood Technics Programs

Respond to: Si Hertzler or
Roland Krogstad
Wisconsin Board of Vocational, Technical
and Adult Education
310 Price Place
P.O. Box 7874
Madison, Wisconsin 53707
(608) 267-9062
(608) 266-3705

Distribution: District Directors
Research Administrators
Request Distribution List

There are changes taking place in the woodworking industries and there is a need for updating certain aspects of our VTAE Wood Technics training courses/programs. Our Bureaus of Program Development and Operations, and Planning and Management Information are cooperating in the conduct of this study.

The study calls for a survey of a minimum of 100 former students and 100 employers in the field. The project involves working through each VTAE District in the identification of the samples to be surveyed, distribution and collection of questionnaires.

Please identify at least a representative 35 percent sample of former students who graduated during each of the past three years from your Wood Technics program. Solicit their cooperation, and mail or deliver the questionnaire, and have it returned or collected. NOTE: (Only Districts One, NWTI, Four, BTI, FVTI, NWTI, MSTI participate in this phase of the study.)

In addition, the above districts please identify at least ten representative employers involved in the field. Most of these should be employers of your district's graduates from Wood Technics. Districts with no Wood Technics graduates should identify only three employers. Please solicit their cooperation, mail or deliver and collect the questionnaire.

A packet of questionnaires has been addressed to your Research Administrator. Please send all completed questionnaires to Roland Krogstad,

of our office, by May 25, 1985. Districts may wish to develop their own cover letter and return envelopes as needed. The report of the study will be used for discussion at instructor workshops.

This is an important project in our efforts to continuously maintain programs relevant to the needs.

Your cooperation and assistance are greatly appreciated. Please contact Si Hertzler or Roland Krogstad in our office if you should have any questions.

Robert P. Sorensen
State Director

RPS/RK/hed

Wisconsin Board of Vocational, Technical and Adult Education

Robert P. Sorensen, Ph.D.
State Director

Dear Employee or Former Wood Technics Student:

The Vocational, Technical and Adult Education (VTAE) System in Wisconsin is conducting a research study of our Wood Technics Programs. We are pleased that you are a graduate or former student from one of our VTAE districts. There are indications of a need to update these programs.

The purposes of the study are to verify the relative importance of tasks performed on the job, the relative importance of various courses offered in the programs, and to obtain information on future changes and needs anticipated in the field. The results of the study will be helpful to our Advisory Committees and instructors in helping them revise and update the Wood Technics Programs.

We know you are busy, but we would greatly appreciate your completing the attached questionnaire and returning it to your VTAE district. The information supplied will assist us in improving the program for future students. The information will be strictly confidential and your responses will not be identified in the findings or final report.

If you should have any questions, please contact your VTAE school or Si Bertzler of our office, telephone (608) 267-9061.

Sincerely,

Robert P. Sorensen

Robert P. Sorensen, Ph.D.
State Director

RPS/RK/hed

Enclosure

4802 Sheboygan Avenue P.O. Box 7874 Madison, WI 53707 608-266-1207

- Graduate/Former Student/Employee Questionnaire -

WOOD TECHNICS SURVEY

1. Did you attend or graduate from a VTAE Wood Technics Program?
Yes ___ No ___

2. If "Yes," which VTAE school? _____

3-6. At what position in Wood Technics were you initially employed during or after leaving the program? What is your present job title/classification? If not employed in Wood Technics area, check item 4.8 or 6.8

	3-4 Initially Employed		5-6 Currently Employed	
Self-employed	3.1	_____	5.1	_____
Trainee	3.2	_____	5.2	_____
Carpenter's Apprentice	3.3	_____	5.3	_____
Carpenter's Helper	3.4	_____	5.4	_____
Cabinetmaker's Apprentice	3.5	_____	5.5	_____
Cabinetmaker's Helper	3.6	_____	5.6	_____
Furniture Maker Apprentice	3.7	_____	5.7	_____
Furniture Maker Helper	3.8	_____	5.8	_____
Rough Carpenter	3.9	_____	5.9	_____
Machine Maintenance Worker	4.1	_____	6.1	_____
Office Worker	4.2	_____	6.2	_____
Draftsperson	4.3	_____	6.3	_____
Salesperson	4.4	_____	6.4	_____
Estimator	4.5	_____	6.5	_____
Other (Specify)_____	4.6	_____	6.6	_____
Other (Specify)_____	4.7	_____	6.7	_____
Not employed in Wood Technics area	4.8	_____	6.8	_____

7-8. In what type of business or firm did you get your first job in the Woodworking related field?

____ 7-1. Residential Construction and/or contractor
____ 7-2. Commercial or Industrial Construction
____ 7-3. Cabinetmaking Shop
____ 7-4. Furniture Making Shop
____ 7-5. Retail/Wholesale Lumberyard/Dealer
____ 7-6. Building Supply House
____ 7-7. Hardware Store
____ 7-8. Warehousing only
____ 7-9. Manufacture of Millwork Products
____ 8-1. Farm Building Construction (other than houses)
____ 8-2. Restoration of Buildings
____ 8-3. Restoration of Furniture
____ 8-4. Truss Builder
____ 8-5. Other (Specify) _____

9-107. Listed below are a number of tasks or duties which a graduate of a one-year vocational diploma program might do as a carpenter's helper, cabinetmaker's helper, or other job related to woodworking industries. Please check (√) the appropriate column to indicate the relative importance of being able to perform these tasks or duties as they relate to the position you originally obtained.

Task or Duty	Relative Importance (1) Not Important	(2)	(3) Important	(4)	(5) Critically Important	(6) Don't Know
A. PERFORMING CARPENTRY DUTIES						
Do you perform any carpentry duties?						
9. ___Yes. Please complete this section.						
10. ___No. Please go to the next section.						
11. Read architectural/construction blueprints	___	___	___	___	___	___
12. Interpret construction specifications	___	___	___	___	___	___
13. Interpret building codes	___	___	___	___	___	___
14. Draw architectural plans	___	___	___	___	___	___
15. Plan kitchens	___	___	___	___	___	___
16. Develop a bill of materials	___	___	___	___	___	___
17. Identify building materials	___	___	___	___	___	___
18. Stake out buildings/establish elevations	___	___	___	___	___	___
19. Frame and align exterior walls	___	___	___	___	___	___
20. Install joists/subfloors	___	___	___	___	___	___
21. Install beam/girder	___	___	___	___	___	___
22. Frame and align interior walls	___	___	___	___	___	___
23. Frame and install rafters	___	___	___	___	___	___
24. Nail with power hammer	___	___	___	___	___	___
25. Erect scaffolding	___	___	___	___	___	___
26. Install insulation/vapor barriers	___	___	___	___	___	___
27. Use and maintain hand tools	___	___	___	___	___	___
28. Use and maintain power tools	___	___	___	___	___	___
29. Install exterior door	___	___	___	___	___	___
30. Install interior door	___	___	___	___	___	___
31. Install windows	___	___	___	___	___	___
32. Install exterior sheathing	___	___	___	___	___	___
33. Install exterior trim	___	___	___	___	___	___
34. Install sheet rock/rock lath	___	___	___	___	___	___
35. Install paneling	___	___	___	___	___	___
36. Install interior trim	___	___	___	___	___	___
37. Install wood siding	___	___	___	___	___	___
38. Install roof sheathing	___	___	___	___	___	___
39. Install roofing/shingles	___	___	___	___	___	___
40. Glaze windows	___	___	___	___	___	___
41. Frame and install stairs	___	___	___	___	___	___
42. Mix and apply paint	___	___	___	___	___	___
43. Apply interior finish	___	___	___	___	___	___
44. Repair a roof	___	___	___	___	___	___

Task or Duty	Relative Importance (1) Not Important	(2)	(3) Important	(4)	(5) Critically Important	(6) Don't Know
45. Install floor tile/linoleum.....	___	___	___	___	___	___
46. Other (Specify) _____	___	___	___	___	___	___
47. Other (Specify) _____	___	___	___	___	___	___

B. PERFORMING MASONRY/CONCRETE DUTIES

Do you perform any masonry/concrete duties?

48. ___ Yes. Please complete this section.
49. ___ No. Please go on to the next section.

50. Calculate concrete needed for a job.....	___	___	___	___	___	___
51. Install concrete forms.....	___	___	___	___	___	___
52. Calculate concrete blocks needed.....	___	___	___	___	___	___
53. Calculate brick needed.....	___	___	___	___	___	___
54. Remove forms.....	___	___	___	___	___	___
55. Repair concrete.....	___	___	___	___	___	___
56. Other (specify) _____	___	___	___	___	___	___
57. Other (specify) _____	___	___	___	___	___	___

C. PERFORMING CABINETMAKING DUTIES

Do you perform any cabinetmaking duties?

58. ___ Yes. Please complete this section.
59. ___ No. Please go on to the next section.

60. Read cabinet drawings/blueprints.....	___	___	___	___	___	___
61. Interpret cabinetry specifications.....	___	___	___	___	___	___
62. Draw detailed cabinet plans.....	___	___	___	___	___	___
63. Make materials list.....	___	___	___	___	___	___
64. Layout and cut cabinet components.....	___	___	___	___	___	___
65. Assemble cabinet.....	___	___	___	___	___	___
66. Make and install drawers.....	___	___	___	___	___	___
67. Apply finishing materials.....	___	___	___	___	___	___
68. Install cabinet.....	___	___	___	___	___	___
69. Apply wood veneers.....	___	___	___	___	___	___
70. Apply plastic laminates.....	___	___	___	___	___	___
71. Use of computer assisted machinery.....	___	___	___	___	___	___
72. Install counter top.....	___	___	___	___	___	___
73. Other (Specify) _____	___	___	___	___	___	___

D. PERFORMING FURNITURE MAKING DUTIES

Do you perform any furniture making duties?

74. ___ Yes. Please complete this section.
75. ___ No. Please go on to the next section.

76. Read furniture drawings (blueprints).....	___	___	___	___	___	___
77. Interpret furniture specifications.....	___	___	___	___	___	___
78. Draw detailed furniture plans.....	___	___	___	___	___	___
79. Design furniture.....	___	___	___	___	___	___
80. Layout furniture components.....	___	___	___	___	___	___
81. Cut furniture components.....	___	___	___	___	___	___

Task or Duty	Relative Importance (1) Not Important	(2)	(3)	(4)	(5) Critically Important	(6) Don't Know
82. Assemble furniture.....	___	___	___	___	___	___
83. Finish furniture.....	___	___	___	___	___	___
84. Repair/restore furniture.....	___	___	___	___	___	___
85. Upholster furniture.....	___	___	___	___	___	___
86. Other (specify) _____	___	___	___	___	___	___

E. PERFORMING PATTERNMAKING DUTIES

Do you perform any patternmaking duties?

87. ___ Yes. Please complete this section.
88. ___ No. Please go on to the next section.

89. Read pattern/casting blueprints.....	___	___	___	___	___	___
90. Design patterns.....	___	___	___	___	___	___
91. Construct patterns.....	___	___	___	___	___	___
92. Other (Specify) _____	___	___	___	___	___	___

F. PERFORMING ADMINISTRATIVE DUTIES

Do you perform any administrative duties?

93. ___ Yes. Please complete this section.
94. ___ No. Please go on to the next section.

95. Assemble data for bookkeeping services....	___	___	___	___	___	___
96. Make out energy worksheet.....	___	___	___	___	___	___
97. Charge sales to customer's accounts.....	___	___	___	___	___	___
98. Wait on/serve customers.....	___	___	___	___	___	___
99. Order materials.....	___	___	___	___	___	___
100. Take inventory.....	___	___	___	___	___	___
101. Prepare employee payroll.....	___	___	___	___	___	___
102. Pay accounts payable.....	___	___	___	___	___	___
103. Schedule work assignments.....	___	___	___	___	___	___
104. Use computer.....	___	___	___	___	___	___
105. Prepare income tax information.....	___	___	___	___	___	___
106. Other (specify) _____	___	___	___	___	___	___
107. Other (specify) _____	___	___	___	___	___	___

108-144. Listed below are courses, subjects, or units of instruction which may or may not be important in the training of Wood Technics students and/or beginning "woodworkers." Please check (✓) the appropriate column to indicate the relative importance of each subject for inclusion in the training program.

Courses, Subjects Units of curriculum/instruction	Relative Importance (1) Not Important	(2)	(3)	(4)	(5) Critically Important	(6) Don't Know
108. Fundamentals of building construction.....	___	___	___	___	___	___
109. Concrete form construction.....	___	___	___	___	___	___
110. Fundamentals of cabinetmaking.....	___	___	___	___	___	___
111. Fundamentals of millwork.....	___	___	___	___	___	___
112. Fundamentals of furniture making.....	___	___	___	___	___	___
113. Fundamentals of finishing, painting, etc.....	___	___	___	___	___	___
114. Wood and lumber materials.....	___	___	___	___	___	___
115. Plastics, laminates, adhesives, etc.....	___	___	___	___	___	___
116. Hardware, fasteners, glass.....	___	___	___	___	___	___
117. Insulation materials, installation.....	___	___	___	___	___	___
118. Cabinet drawing.....	___	___	___	___	___	___
119. Architectural drawing.....	___	___	___	___	___	___
120. Furniture drawing.....	___	___	___	___	___	___
121. Blueprint reading.....	___	___	___	___	___	___
122. Building codes.....	___	___	___	___	___	___
123. Estimating/Bills of Materials.....	___	___	___	___	___	___
124. Solar energy systems.....	___	___	___	___	___	___
125. Energy conservation practices.....	___	___	___	___	___	___
126. Use and care of hand tools.....	___	___	___	___	___	___
127. Use and care of portable power tools.....	___	___	___	___	___	___
128. Safety.....	___	___	___	___	___	___
129. Fundamentals of knife/saw sharpening.....	___	___	___	___	___	___
130. Use and care of machines.....	___	___	___	___	___	___
131. Applied arithmetic.....	___	___	___	___	___	___
132. Applied algebra, geometry.....	___	___	___	___	___	___
133. Principles of physics/science.....	___	___	___	___	___	___
134. Applied human relations.....	___	___	___	___	___	___
135. Oral communications.....	___	___	___	___	___	___
136. Written communications.....	___	___	___	___	___	___
137. Problem-solving.....	___	___	___	___	___	___
138. Use of hand calculators.....	___	___	___	___	___	___
139. Use of adding machines.....	___	___	___	___	___	___
140. Use of computers.....	___	___	___	___	___	___
141. Uses of Laser equipment.....	___	___	___	___	___	___
142. Uses of automated equipment (robots).....	___	___	___	___	___	___
143. Other (specify) _____	___	___	___	___	___	___
144. Other (specify) _____	___	___	___	___	___	___

145. What new technologies, job titles, equipment, materials, processes are emerging in the woodworking fields which should be studied?

_____

_____

146. How can the VTAE schools better meet your individual or business needs, such as offering seminars or part-time courses, at school or at your business during day or evening?

_____

_____

147. How would you rate the overall training you received in Wood Technics at the VTAE school?

___ 147-1. Excellent ___ 147-2. Very Good ___ 147-3. Good

___ 147-4. Fair ___ 147-5. Poor

148. Additional comments/suggestions for VTAE schools to improve Wood Technics courses/programs.

_____

_____

_____

_____

RK/hed
4/1/85

Wisconsin Board of Vocational, Technical and Adult Education

Robert P. Sorensen, Ph.D.
State Director

Dear Employer/Supervisor:

The Vocational, Technical and Adult Education (VTAE) System in Wisconsin is conducting a research study of our Wood Technics Programs. Most of these programs are one year in length and are designed to prepare students for entry into cabinetmaking, furniture making, building construction and/or related occupations. The programs offer training in the fundamentals of drawing, blueprint reading, design, estimating, selection of materials, use and maintenance of hand and power tools, procedures used in the industries, applied mathematics, science, communications and human relations.

The purposes of the study are to verify the relative importance of tasks performed on the job, the relative importance of various courses offered in the programs, and to obtain information on future changes and needs anticipated in the field. The results of the study will be helpful to our Advisory Committees and instructors and will be used to revise and update the VTAE Wood Technics Programs.

We know you are busy, but your assistance in this study would be of great value to assist us in helping you. We would appreciate it if you or someone else in management or supervision would complete the attached questionnaire and return it to your VTAE district. The data and information supplied will be strictly confidential and your company will not be identified with your data or information in the findings/report.

If you should have any questions, please contact Si Hertzler of our office, telephone (608) 267-9061.

Sincerely,

Robert P. Sorensen

Robert P. Sorensen, Ph.D.
State Director

RPS/RK/hed

Enclosure

4802 Sheboygan Avenue P.O. Box 7874 Madison, WI 53707 608-266-1207

- Employer Questionnaire -

WOOD TECHNICS SURVEY

1-2. Which of the following best describes your business?

___ 1-1. Residential Construction and/or contractor
___ 1-2. Commercial or industrial construction and/or contracting
___ 1-3. Cabinetmaking Shop
___ 1-4. Furniture Making Shop
___ 1-5. Retail/wholesale lumber yard/dealer
___ 1-6. Building Supply House
___ 1-7. Hardware Store
___ 1-8. Warehousing only
___ 1-9. Manufacture of Millwork Products
___ 2-1. Farm Building Construction (other than houses)
___ 2-2. Restoration of Buildings
___ 2-3. Restoration of Furniture
___ 2-4. Truss Builder
___ 2-5. Other (specify) _____

3. What is the approximate total number of employees working for your company, firm, or business locally on a full-time or year round basis?

___ 1. Five or less
___ 2. 6-10
___ 3. 11-25
___ 4. 26-50
___ 5. 51-100
___ 6. 101 or over

4. How many total carpenters, cabinetmakers, furniture makers, or other woodworking related workers are generally employed by your firm or business locally on a year round basis? Where did they get their training?

___ 1. None
___ 2. 1 to 2
___ 3. 3 to 5
___ 4. 6 to 10
___ 5. 11 to 25
___ 6. 26 or more

7. About how many of these are graduates from VTAE schools? _____
8. About how many were hired directly out of high school? _____
9. About how many were hired "off the street" or from other sources and participated in an On-the-Job training program? _____

5. How many total additional carpenters, cabinetmakers, furniture makers, or other woodworking related workers are generally employed by your firm or business locally on a seasonal or part-time basis? Where did they get their training?

___ 1. None
___ 2. 1 to 2
___ 3. 3 to 5
___ 4. 6 to 10
___ 5. 11 to 25
___ 6. 26 or more

7. About how many of these are graduates from VTAE schools? _____
8. About how many were hired directly out of high school? _____
9. About how many were hired "off the street" or from other sources and participated in an On-the-Job training program? _____

6-7. How many woodworking employees do you have in each of the following job classifications?

___6-1. Cabinetmaker
___6-2. Cabinetmaker apprentice/helper
___6-3. Cabinetmaker Supervisor
___6-4. Cabinet/Furniture Finisher
___6-5. Carpenter (all around)
___6-6. Carpenter (rough)
___6-7. Carpentry (Finish work only)
___6-8. Carpenter apprentice/helper
___6-9. Carpenter Supervisor
___7-1. Painter (houses, buildings)
___7-2. Estimator, Pricing, specifications
___7-3. Architectural Draftsperson
___7-4. Woodworking tool/machine
___7-5. Salesperson
___7-6. Special machine operator (specify)
_____
___7-7. Other (specify)
_____

8-106. Listed below are a number of tasks or duties which a graduate of a one-year vocational diploma program might do as a carpenter's helper, cabinetmaker's helper, or other job related to woodworking industries. Please check (√) the appropriate column to indicate the relative importance of being able to perform these tasks or duties as they relate to a job entry woodworker in your business.

Task or Duty	Relative Importance (1) Not Important	(2)	(3) Important	(4)	(5) Critically Important	(6) Don't Know
A. PERFORMING CARPENTRY DUTIES						
Do your employees perform any carpentry duties?						
8. ___ Yes. Please complete this section.						
9. ___ No. Please go on to the next section.						
10. Read architectural/contruction blueprints..	___	___	___	___	___	___
11. Interpret construction specifications.....	___	___	___	___	___	___
12. Interpret building codes.....	___	___	___	___	___	___
13. Draw architectural plans.....	___	___	___	___	___	___
14. Plan kitchens.....	___	___	___	___	___	___
15. Develop a bill of materials.....	___	___	___	___	___	___
16. Identify building materials.....	___	___	___	___	___	___
17. Stake out buildings/establish elevations...	___	___	___	___	___	___
18. Frame and align exterior walls.....	___	___	___	___	___	___
19. Install joists/subfloors.....	___	___	___	___	___	___
20. Install beam/girder.....	___	___	___	___	___	___
21. Frame and align interior walls.....	___	___	___	___	___	___
22. Frame and install rafters.....	___	___	___	___	___	___
23. Nail with power hammer.....	___	___	___	___	___	___
24. Erect scaffolding.....	___	___	___	___	___	___
25. Install insulation/vapor barriers.....	___	___	___	___	___	___
26. Use and maintain hand tools.....	___	___	___	___	___	___
27. Use and maintain power tools.....	___	___	___	___	___	___

Task or Duty	Relative Importance (1) Not Important	(2)	(3)	(4)	(5) Critically Important	(6) Don't Know
28. Install exterior doors						
29 Install interior doors						
30. Install windows						
31. Install exterior sheathing						
32. Install exterior trim						
33. Install sheet rock/rock lath						
34. Install paneling						
35. Install interior trim						
36. Install wood siding						
37. Install roof sheathing						
38. Install roofing						
39. Glaze windows						
40. Frame and install stairs						
41. Mix and apply paint						
42. Apply interior finish						
43. Repair a roof						
44. Install floor tile/linoleum						
45. Other (Specify) _____						
46. Other (Specify) _____						

B. PERFORMING MASONRY/CONCRETE DUTIES

Do your employees perform any masonry/concrete duties?

47. ___ Yes. Please complete this section.
48. ___ No. Please go on to the next section.

49. Calculate concrete needed for a job						
50. Install concrete forms						
51. Calculate concrete blocks needed						
52. Calculate brick needed						
53. Remove forms						
54. Repair concrete						
55. Other (specify) _____						
56. Other (specify) _____						

C. PERFORMING CABINETMAKING DUTIES

Do your employees perform any cabinetmaking duties?

57. ___ Yes. Please complete this section.
58. ___ No. Please go on to the next section.

59. Read cabinet drawings/blueprints						
60. Interpret cabinetry specifications						
61. Draw detailed cabinet plans						
62. Make materials list						
63. Layout and cut cabinet components						
64. Assemble cabinet						
65. Make and install drawers						
66. Apply finishing materials						
67. Install cabinet						
68. Apply wood veneers						
69. Apply plastic laminates						
70. Use of computer assisted machinery						
71. Install counter top						
72. Other (specify) _____						

Task or Duty	Relative Importance (1) Not Important	(2)	(3)	(4)	(5) Critically Important	(6) Don't Know

D. PERFORMING FURNITURE MAKING DUTIES

Do your employees perform any furniture making duties?

73. ___ Yes. Please complete this section.
74. ___ No. Please go on the next section.

75. Read furniture drawings (blueprints).....	___	___	___	___	___	___
76. Interpret furniture specifications.....	___	___	___	___	___	___
77. Draw detailed furniture plans.....	___	___	___	___	___	___
78. Design furniture.....	___	___	___	___	___	___
79. Layout furniture components.....	___	___	___	___	___	___
80. Cut furniture components.....	___	___	___	___	___	___
81. Assemble furniture.....	___	___	___	___	___	___
82. Finish furniture.....	___	___	___	___	___	___
83. Repair/restore furniture.....	___	___	___	___	___	___
84. Other (specify) _____	___	___	___	___	___	___
85. Other (specify) _____	___	___	___	___	___	___

E. PERFORMING PATTERNMAKING DUTIES

Do your employees perform any patternmaking duties?

86. ___ Yes. Please complete this section.
87. ___ No. Please go on to the next section.

88. Read pattern and casting blueprints.....	___	___	___	___	___	___
89. Design patterns.....	___	___	___	___	___	___
90. Construct patterns.....	___	___	___	___	___	___
91. Other (specify) _____	___	___	___	___	___	___

F. PERFORMING ADMINISTRATIVE DUTIES

Do your woodworking employees perform any administrative duties?

92. ___ Yes. Please complete this section.
93. ___ No. Please go on to the next section.

94. Assemble data for bookkeeping services....	___	___	___	___	___	___
95. Make out energy worksheet.....	___	___	___	___	___	___
96. Charge sales to customer's accounts.....	___	___	___	___	___	___
97. Wait on/serve customers.....	___	___	___	___	___	___
98. Order materials.....	___	___	___	___	___	___
99. Take inventory.....	___	___	___	___	___	___
100. Prepare employee payroll.....	___	___	___	___	___	___
101. Pay accounts payable.....	___	___	___	___	___	___
102. Schedule work assignments.....	___	___	___	___	___	___
103. Use computer.....	___	___	___	___	___	___
104. Prepare income tax information.....	___	___	___	___	___	___
105. Other (specify) _____	___	___	___	___	___	___
106. Other (specify) _____	___	___	___	___	___	___

107-143. Listed below are courses, subjects, or units of instruction which may or may not be important in the training of Wood Technics students and/or beginning "woodworkers" in your business. Please check (√) the appropriate column to indicate the relative importance of each subject for inclusion in the training program.

Units	Courses, Subjects of curriculum/instruction	Relative Importance (1) Not Important	(2)	(3) Important	(4)	(5) Critically Important	(6) Don't Know
107.	Fundamentals of building construction.....						
108.	Concrete form construction.....						
109.	Fundamentals of cabinetmaking.....						
110.	Fundamentals of millwork.....						
111.	Fundamentals of furniture making.....						
112.	Fundamentals of finishing, painting, etc...						
113.	Wood and lumber materials.....						
114.	Plastics, laminates, adhesives, etc.....						
115.	Hardware, fasteners, glass.....						
116.	Insulation materials, installation.....						
117.	Cabinet drawing.....						
118.	Architectural drawing.....						
119.	Furniture drawing.....						
120.	Blueprint reading.....						
121.	Building codes.....						
122.	Estimating/Bills of Materials.....						
123.	Solar energy systems.....						
124	Energy conservation practices.....						
125.	Use and care of hand tools.....						
126.	Use and care of portable power tools.....						
127.	Safety.....						
128.	Fundamentals of knife/saw sharpening.....						
129.	Use and care of machines.....						
130.	Applied arithmetic.....						
131.	Applied algebra, geometry.....						
132.	Principles of physics/science.....						
133.	Applied human relations.....						
134.	Oral communications.....						
135.	Written communications.....						
136.	Problem-solving.....						
137.	Use of hand calculators.....						
138.	Use of adding machines.....						
139.	Use of computers.....						
140.	Uses of Laser equipment.....						
141.	Uses of automated equipment (robots).....						
142.	Other (specify) _____						
143.	Other (specify) _____						

144. What new technologies, job titles, equipment, materials, processes are emerging in the woodworking fields which should be studied?

_____

_____

145. How can the VTAE schools better meet your individual or business needs, such as offering seminars or part-time courses, at school or at your business during day or evening?

_____

_____

146. How can you/your business improve the training of wood technics students? Consider such things as permitting students to observe business operations, allow students to work in your business under supervision for a few days or weeks, allow employees to teach a class session at school or provide instruction at your business.

_____

_____

147. Additional comments/suggestions for VTAE schools to improve Wood Technics courses/programs.

_____

_____

_____

_____

RK/hed
4/1/85

APPENDIX B

Table 45

RELATIVE DIFFICULTY OF CARPENTRY DUTIES (Q 11-47) (Q 10-46)

Carpentry Tasks/Duties	State Total: Carpenters 45	Employer 44	Mid Atlantic: One Union		Multi Unions		Midwest Union		Mid Union		Multi Unions		Multi Unions		Multi Unions		Multi Unions		Mid. Atl. States	
	Union/Rank	Non-Union/Rank	Grade 10	Employer 6	Grade 17	Employer 7	Grade 6	Employer 5	Grade 1	Employer 10	Grade 2	Employer 2	Grade 6	Employer 3	Grade 7	Employer 7	Grade 8	Employer 10	Employer 3	
Read architectural/construction blueprints	3.87/10.5	3.35/6	4.29		15	19	19	19	4.29	19	19	4.29	19	19	19	19	19	19	19	19
Interpret construction specifications	3.49	3.35/3	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Interpret building codes	3.68	2.53	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Draw architectural plans	2.37	1.69	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Plan kitchens	2.48	1.56	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Develop a bill of materials	3.58	2.87	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Identify building materials	4.39/1	3.65/5	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Stake out buildings/establish elevations	2.58	2.31	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Frame and align exterior walls	3.58/5.5	2.46	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install joists/subfloors	3.71/8	2.52	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install beam/girder	3.44	2.47	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Frame and align interior walls	3.55/6	2.57	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Frame and install rafters	3.64/10	2.73	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Nail with power hammer	2.68	2.74	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Erect scaffolding	3.58	2.56	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install insulation/vapor barriers	3.19	2.59	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Use and maintain hand tools	4.58/3	3.65/1	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Use and maintain power tools	4.68/2	3.58/1	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install exterior door	3.61/8	2.87	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install interior door	3.67/10.5	2.87	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install window	3.67/10.5	2.86	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install exterior sheathing	3.56	2.65	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install exterior trim	3.58	2.55	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install sheet rock/rock lath	3.58	2.59	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install paneling	3.55	2.55	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install interior trim	3.58/5.5	2.58/6	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install wood siding	3.68/9	2.62	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install roof sheathing	3.55	2.55	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install roofing/shingles	3.59	2.55	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Glaze windows	2.57	1.58	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Frame and install stairs	3.55	2.55	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Mix and apply paint	2.59	1.58	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Apply interior finish	2.59	2.56	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Repair a roof	3.55	2.52	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Install floor tile/linoleum	2.58	1.58	19		15	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19

Table 46

RELATIVE DIFFERENCE OF MASONRY/CONCRETE DUTIES (Q 10-21) (Q 0-21)

Masonry/Concrete Tasks/Duties	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
Calculate concrete needed for a job	4.13/1	3.23/3	19		19	19	19			19		19	19	19	19	19	19	19	19	19
Install concrete forms	3.83/2	3.33/2	19		19	19	19			19		19	19	19	19	19	19	19	19	19
Calculate concrete blocks needed	3.73/5	2.7	19		19	19	19			19		19	19	19	19	19	19	19	19	19
Calculate brick needed	3.62	2.46	19		19	19	19			19		19	19	19	19	19	19	19	19	19
Remove forms	3.32	2.55/1	19		19	19	19			19		19	19	19	19	19	19	19	19	19
Repair concrete	3.86	3.09	19		19	19	19			19		19	19	19	19	19	19	19	19	19

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APPENDIX E

Table 47

RELATIVE IMPORTANCE OF CABINETMAKING DUTIES (Q 69-72) (Q 57-58)

Cabinetmaking Tasks/Duties	State Total		VIII Districts																	
	Grade B-40	Empl. B-31	One Woman		VIII Woman		Wellman Woman		VII Woman		IVIII Woman		VIII Woman		VIII Woman		VIII Woman		Bal. of State	
	Mean/Rank	Mean/Rank	Grade 9	Employer	Grade 10	Employer 5	Grade 9	Employer 6	Grade 1	Employer 7	Grade 2	Employer 3	Grade 7	Employer 1	Grade 3	Employer 1	Grade 8	Employer 5	Employers 9	
Read cabinet drawings/blueprints	4.56/1	4.35/1	4.00		4.10	4.80	5.00	5.00	5.00	4.14	5.00	4.00	4.71		4.67	3.00	5.00	4.20	3.67	
Interpret cabinetry specifications	4.41/2	4.10/2	3.78		4.00	4.60	4.78	4.57	5.00	4.14	5.00	4.33	4.71		5.00	2.00	4.75	3.40	3.67	
Draw detailed cabinet plans	3.57	2.41	3.67		2.80	2.80	3.89	3.71		2.29	4.00	2.00	3.14	1.00	5.00	1.00	3.80	2.00	1.00	
Make materials list	3.67	3.27	3.56		3.56	3.80	4.11	5.00		3.00	4.00	3.33	3.57		4.67	2.00	4.20	2.00	2.00	
Layout and cut cabinet components	4.27/3	3.63/6	4.13		4.00	3.80	4.33	4.50	5.00	4.14	5.00	3.67	4.57		5.00	2.00	4.13	2.40	3.00	
Assemble cabinet	4.32/3	3.80/4	4.13		4.40	4.40	4.22	4.50	5.00	3.71	5.00	3.67	4.86		4.67	2.00	3.86	3.40	3.00	
Make and install drawers	4.23/6	3.77/5	4.13		4.00	4.80	4.22	4.50	5.00	3.57	5.00	3.33	4.14		5.00	2.00	4.14	3.60	3.67	
Apply finishing materials	4.28/4	3.14	4.00		4.40	3.20	4.11	4.17	5.00	2.43	5.00	3.33	4.29		4.67	2.00	4.14	3.00	2.00	
Install cabinet	4.13/7	3.48/7	4.13		4.44	4.20	3.44	4.29	3.00	2.43	4.50	3.00	4.00		4.67		4.50	4.00	1.67	
Apply wood veneers	3.53	3.10	3.88		3.10	3.60	2.89	2.83	3.00	2.71	5.00	3.33	4.00		4.00	2.00	3.57	2.25	5.00	
Apply plastic laminates	3.83	3.50/3	3.50		4.00	4.40	3.44	4.17	3.00	3.29	4.50	4.00	3.71		4.67		4.13	3.20	3.67	
Use of computer assisted machinery	2.56	1.73	2.33		2.70	2.20	2.56	2.50		1.14	3.00	1.33	2.29	1.00	3.00	2.00	2.14	1.00	2.33	
Install counter tops	3.98	3.38	3.75		4.50	4.20	3.22	4.33	3.00	2.57	4.00	3.00	3.57		5.00		4.50	3.80	1.67	

Table 48

RELATIVE IMPORTANCE OF FURNITURE MAKING DUTIES (Q 76-85) (Q 73-74)

Furniture Making Tasks/Duties	B-04	B-13	B-2	B-0	B-6	B-2	B-5	B-3	B-0	B-3	B-1	B-3	B-2	B-0	B-3	B-1	B-3	B-4	B-2	
Read furniture drawings (blueprints)	4.52/2.5	3.46/5	5.00		4.43	4.00	4.40	3.67		4.00	5.00	3.33	3.50		5.00	1.00	5.00	1.00	5.00	
Interpret furniture specifications	4.43/3	3.57/3	5.00		4.00	4.00	4.40	3.67		3.50	5.00	3.00	4.00		5.00	4.00	5.00	1.00	5.00	
Draw detailed furniture plans	4.14	2.08	4.00		3.57	3.00	3.80	3.33		2.00	5.00	1.33	5.00		4.67	1.00	5.00	1.00	2.00	
Design furniture	4.19	2.14	4.00		3.71	3.00	4.00	3.67		2.00	5.00	1.00	5.00		4.67	1.00	4.50	1.00	2.00	
Layout furniture components	4.29	3.47/4	5.00		3.71	4.00	4.40	3.67		3.00	4.00	3.33	5.00		4.67	3.00	4.50	1.00	5.00	
Cut furniture components	4.52/2.5	3.60/2	5.00		4.29	4.00	4.40	3.67		3.00	5.00	3.33	5.00		4.67	5.00	4.50	1.00	5.00	
Assemble furniture	4.50/4	3.67/1	4.00		4.50	4.50	4.60	3.67		3.00	4.00	3.33	5.00		4.00	5.00	5.00	1.00	5.00	
Finish furniture	4.61/1	3.47	5.00		4.50	4.50	4.60	5.00		2.33	5.00	2.33	5.00		5.00	5.00	4.67	1.00	4.00	
Repair/restore furniture	3.74	2.85	4.00		4.00	3.50	2.80	5.00		3.00		2.00	5.00		4.00	5.00	4.00	1.00	1.00	
Upholster furniture	2.59	N/A	2.00		2.88		1.40				5.00		3.50		3.67		1.00			

Table 49

RELATIVE IMPORTANCE OF PATTERNMAKING DUTIES (Q 89-91) (Q 86-87)

Patternmaking Tasks/Duties	B-14	B-11	B-1	B-0	B-5	B-2	B-1	B-0	B-1	B-3	B-1	B-2	B-1	B-0	B-2	B-1	B-2	B-2	B-1	
Read pattern/casting blueprints	4.46	3.00	5.00		4.75	4.50	5.00		5.00	2.00	5.00	5.00	3.00		4.00	1.00	4.00	3.00	1.00	
Design patterns	4.34/2	3.33/2	5.00		4.25	4.50	5.00			3.33	4.50	5.00	4.00		4.50	3.00	5.00	1.00	5.00	
Construct patterns	4.69/1	3.82/1	5.00		4.75	4.50	5.00		5.00	3.33	4.00	5.00	5.00		4.50	3.00	5.00	2.50	5.00	

Table 50

RELATIVE IMPORTANCE OF ADMINISTRATIVE DUTIES (Q 93-103) (Q 94-104)

Administrative Tasks/Duties	B-30	B-23	B-5	B-0	B-10	B-2	B-4	B-6	B-0	B-5	B-1	B-1	B-1	B-0	B-3	B-1	B-4	B-4	B-2	
Assemble data for bookkeeping services	3.48	3.75/3	3.60		2.83	3.00	4.50	4.83		3.20	5.00	3.00	1.00		2.00		4.40	3.25	4.00	
Make out energy worksheet	2.83	1.76	3.40		2.00	3.00	3.00	2.00		1.40	4.00	1.00	1.00		2.67		3.00	1.00	2.50	
Charge sales to customer's accounts	3.96/4	2.89	3.60		4.17	3.00	4.25	4.60		3.00	4.00	1.00	5.00		3.00		4.25	1.67	1.00	
Wait on/serve customers	4.15/2.5	3.06/5	3.80		4.43	5.00	4.00	4.00		3.20	5.00	1.00	5.00		3.00		4.40	2.33	1.00	
Order materials	4.37/1	3.82/2	4.20		4.67	5.00	4.25	4.80		3.60	5.00	3.00	5.00		3.00	3.00	4.40	2.75	4.00	
Take inventory	3.57/5	3.95/1	3.40		4.00	5.00	3.00	4.83		3.80	4.00	3.00	1.00		3.33	3.00	4.00	2.75	4.00	
Prepare employee payroll	2.91	2.28	2.60		1.20	3.00	4.00	3.40		1.20	4.00	1.00	1.00		4.00		3.75	1.67	3.00	
Pay accounts payable	3.22	2.06	2.60		2.60	3.00	4.25	3.00		1.40	4.00	1.50	1.00		3.67		3.75	1.00	3.00	
Schedule work assignments	4.15/2.5	3.40/4	3.80		4.14	3.00	4.00	4.50		2.20	5.00	3.00	5.00		4.00	3.00	4.40	2.67	5.00	
Use computer	3.08	2.53	3.20		2.50	3.00	3.50	4.00		1.80		1.00	1.00		2.67	1.00	3.80	1.00	3.00	
Prepare income tax information	3.29	1.33	3.00		2.67	1.00	4.50	2.00		1.20		1.00	1.00		2.67		3.75	1.00	1.00	

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APPENDIX F
Table 32
RELATIVE IMPORTANCE OF COURSES/SUBJECTS/UNITS OF INSTRUCTION (Q 109-142) (Q 107-141)

Courses/Subjects/Units of Instruction	State Total Graduates 77 Hean/Rank	State Total Employers 52 Mean/Rank	VTAE Districts: Gateway Mean Grade 10	Gateway Mean Employer 2	Mid-State Mean Grade 21	Mid-State Mean Employer 7	Moraine Park Mean Grade 9	Moraine Park Mean Employer 7	Nicolet Mean Grade 2	Nicolet Mean Employer 12	Northeast Mean Grade 2	Northeast Mean Employer 3	Southwest Mean Grade 8	Southwest Mean Employer 5	Western Mean Grade 10	Western Mean Employer 6	Waukesha Mean Grade 15	Waukesha Mean Employer 11	Bal. of State Employer 4
Fundamentals of building construction	4.32/3	3.51/12	4.30	1.00	4.43	4.29	3.88	3.71	2.00	2.80	3.00	2.00	4.63	4.80	4.38	4.88	4.38	3.40	3.67
Concrete form construction	3.39	2.39	3.30	1.00	3.57	3.33	2.56	1.80	2.00	2.00	2.33	2.00	2.00	3.75	2.40	3.38	1.88	2.33	2.00
Fundamentals of cabinetmaking	3.92/12	3.11	3.20	1.00	3.43	3.38	4.22	4.29	3.00	3.00	3.00	3.00	4.33	4.38	1.88	4.38	1.88	2.67	3.75
Fundamentals of millwork	3.58	3.33/13.5	3.30	3.00	3.38	3.38	3.88	4.86	4.00	3.00	4.00	3.67	4.25	3.00	3.38	3.88	1.88	2.40	2.75
Fundamentals of furniture making	3.53	2.43	2.78	1.00	3.52	2.43	3.88	3.33	2.00	2.42	4.00	4.00	3.75	1.88	3.38	3.88	1.88	1.40	2.50
Fundamentals of finishing, painting, etc.	3.60	2.98	2.80	3.00	3.52	2.43	3.88	2.00	2.00	2.78	3.00	3.00	3.88	1.50	3.38	3.88	1.88	1.40	2.50
Wood and lumber materials	4.07/10	3.80/5	4.20	3.00	4.05	4.14	4.33	4.57	3.00	3.50	3.00	3.33	4.50	3.88	3.38	3.88	1.88	2.11	2.75
Plastics, laminates, adhesives, etc.	3.48	3.29/13	3.20	2.00	3.33	3.57	3.88	4.33	2.50	3.50	3.00	4.00	3.50	1.50	3.38	3.88	1.88	2.11	2.50
Hardware, fasteners, glass	3.40	3.33/13.5	3.20	4.00	3.57	3.00	3.44	4.33	2.50	3.50	3.00	4.00	3.50	2.50	3.38	3.88	1.88	2.11	2.50
Insulation materials, installation	3.77/14	3.47	4.00	1.00	3.76	3.33	3.88	4.29	1.50	3.00	4.00	3.00	4.63	2.50	3.38	3.88	1.88	2.11	2.50
Cabinet drawing	3.39	2.89	3.70	1.00	3.24	2.17	4.00	4.00	2.50	3.00	4.00	3.67	3.88	1.88	3.38	3.88	1.88	2.11	2.50
Architectural drawing	3.99/11	2.80	4.00	1.00	3.48	2.71	3.88	4.57	2.00	2.44	4.00	3.33	4.38	1.88	3.38	3.88	1.88	2.11	2.50
Furniture drawing	3.20	2.26	2.90	1.00	3.14	1.67	3.63	2.83	2.50	2.22	3.00	3.00	3.75	1.88	3.38	3.88	1.88	2.11	2.50
Blueprint reading	4.37/2	3.94/3	4.80	3.00	3.95	4.00	4.13	4.86	4.00	3.78	3.00	4.00	4.13	3.40	3.38	3.88	1.88	2.11	2.50
Building codes	3.85/13	2.70	4.20	1.00	3.52	2.40	3.56	3.00	2.00	2.38	3.00	2.00	4.13	2.00	3.38	3.88	1.88	2.11	2.50
Estimating/bills of materials	4.21/5	2.88	4.30	3.00	4.00	3.29	3.78	4.71	2.00	2.00	3.67	4.00	4.50	2.40	3.38	3.88	1.88	2.11	2.50
Solar energy systems	3.11	1.91	3.20	1.00	3.10	1.67	3.00	2.83	2.00	1.89	2.00	1.00	3.00	2.00	3.38	3.88	1.88	2.11	2.50
Energy conservation practices	3.41	2.57	4.20	4.00	3.29	3.17	3.33	4.00	2.00	1.89	2.00	2.00	3.00	2.40	3.38	3.88	1.88	2.11	2.50
Use and care of hand tools	4.11/8	3.88/4	4.40	4.00	4.19	3.71	4.33	4.71	3.00	3.33	3.00	3.00	3.75	4.20	4.38	4.38	1.88	2.78	3.00
Use and care of portable power tools	4.27/4	4.00/2	4.40	4.00	4.29	3.71	4.33	4.71	3.00	3.33	3.00	3.00	3.75	4.20	4.38	4.38	1.88	2.78	3.00
Safety	4.35/1	4.38/1	4.70	3.00	4.52	4.43	4.67	4.57	4.00	3.50	3.00	3.33	4.88	4.60	4.38	4.38	1.88	2.78	3.00
Fundamentals of knife/saw sharpening	3.43	2.87	3.30	3.00	3.43	3.14	3.44	3.67	2.50	2.33	3.00	3.00	4.00	4.00	3.38	3.88	1.88	2.78	3.00
Use and care of machines	4.15/7	3.79/6	4.30	3.00	4.05	3.29	4.22	4.29	3.00	3.00	3.00	3.67	4.25	3.00	3.38	3.88	1.88	2.78	3.00
Applied arithmetic	4.09/9	3.68/9	4.30	4.00	4.05	3.71	4.11	4.71	3.50	3.00	4.00	3.33	4.13	3.80	4.38	4.38	1.88	2.78	3.00
Applied algebra, geometry	3.35	3.26/16	3.70	3.00	3.38	2.43	3.89	4.67	3.00	3.50	4.00	3.33	3.63	3.00	3.38	3.88	1.88	2.78	3.00
Principles of physics/science	3.88	3.41	3.50	3.00	3.86	2.50	3.89	4.57	3.00	3.50	4.00	3.33	3.63	3.00	3.38	3.88	1.88	2.78	3.00
Applied human relations	3.49	3.52/11	3.90	4.00	3.29	3.00	3.56	4.57	2.00	2.11	2.00	1.67	3.38	3.40	3.38	3.88	1.88	2.78	3.00
Oral communications	3.71/15	3.73/7	4.10	3.00	3.38	3.00	3.78	4.86	2.50	3.00	3.00	3.00	3.50	3.40	3.38	3.88	1.88	2.78	3.00
Written communications	3.67/16	3.58/10	4.20	3.00	3.19	3.14	3.78	4.86	2.00	3.00	3.00	3.00	4.00	2.80	3.38	3.88	1.88	2.78	3.00
Problem-solving	4.19/6	3.71/8	4.60	3.00	3.48	3.71	3.89	4.86	3.00	4.11	3.00	3.67	4.38	3.00	3.38	3.88	1.88	2.78	3.00
Use of hand calculators	3.11	2.74	2.90	3.00	2.71	2.29	3.78	4.17	3.00	2.78	2.00	2.33	3.00	2.40	2.88	2.88	1.88	2.60	2.75
Use of adding machines	2.75	2.39	2.70	3.00	2.52	1.83	3.11	3.86	2.50	2.44	2.00	2.00	2.88	1.20	2.40	1.50	3.67	2.78	1.75
Use of computers	3.05	2.07	2.70	2.00	2.90	1.17	3.33	2.83	2.00	2.33	2.00	2.33	2.50	1.60	2.40	1.50	3.67	2.33	1.75
Uses of laser equipment	2.62	1.73	2.60	1.00	2.62	1.67	2.67	1.00	2.00	1.67	3.00	1.33	1.88	1.60	2.20	1.88	3.00	2.20	2.25
Uses of automated equipment (robots)	2.14	1.46	1.40	1.00	2.10	1.33	2.89	1.00	2.00	1.67	2.00	2.67	1.88	1.60	2.00	1.00	2.33	2.20	2.00

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